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ABSTRACT

The study involving 170 children (3-6 years old) investigated attention as a construct of three components and as an integrated cognitive process. Literature was reviewed which related to the components of attention, the development of a theoretical model which synthesizes attentional components with an ongoing process, the development of attention and the use of verbal mediation as an appropriate method of investigating attention, and the developmental relationships among attentional components. Three hypotheses were proposed: (1) reflectivity is related to field independence and task attention and field independence is also related to task attention within age groups; (2) reflectivity will significantly increase as field independence increases and will also increase as task attention increases across age groups; and (3) the average performance in the measures of the components of attention increase significantly as a function of age. The following measures were used: Preschool Embedded Pictures Test, Kansas Reflectivity-Impulsivity Scale for Preschoolers, Preschool Attention-Vigilance Test, and Peabody Picture Vocabulary Test. The hypotheses seemed to be supported in that there were strong inverse correlations between age and the attentional components. (SBH)

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A DEVELOPMENTAL STUDY OF

A COMPONENT ANALYSIS OF ATTENTION

IN THREE THROUGH SIX-YEAR-OLD CHILDREN

A Preliminary Study

Presented to

the Council for Exceptional Children

57th Annual Convention

Dallas, Texas

April 27, 1979

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by

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INTRODUCTION [1]

Those who work with young children note their short attention span. It is usually assumed by teachers and parents alike that this short attention span is related to an inability to select or articulate what is relevant. Attention is then considered as a single trait rather than as several traits. Recent research, however, explains attention as a composite (Keogh and Margolis, 1976,1976a; Douglas 1972,1974; Posner and Bois, 1971). Keogh goes on to describe a study where attentional deficits were listed by teachers as their number one problem, and impulsivity was listed as third (1975). As attention and impulsivity are critical components of learning success (Keogh, 1972), understanding the composite of traits in relationship to the young child will be most helpful in the areas of remediation of any deficit or weaknesses found in a particular trait of the composite. To delineate how children advance on the spectrum of attentional traits by age will also give guidance to those who work with children, not only with regard to early identification of problems but also so that

the children may arrive at their maximum learning potential.

Therefore, to define and measure the pre-mature attentional processes and to understand the relationships between them (Hagen, 1973) is important to fully understand and service the young child who has not yet learned the idiosyncrasies of mature attention (Blum, 1968).

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[1]Acknowledgement is given to my advisor, Dr. Sarah Pickert of the Catholic University of America, where I am a doctoral candidate and to the Computer Center of the Catholic University of America.

THE PROBLEM AND ITS SETTING

The Statement of the Problem

This research proposes to examine the development of attention in young children (ages three, four, five and six). The components of attentional construct in this study are: coming to attention, that is, focusing of attention on a task to glean a clear understanding of it and its requirements; decision making which reflects the impulsivity or reflectivity of the child to decide among alternate solutions when there is a degree of uncertainty; and finally, maintaining attention, which is concentrating on task over a period of time (Keogh and Margolis, 1976, 1976a). This problem leads to some relevant questions.

1. At these age levels, is there a relationship between field independence, impulsivity-reflectivity and task attention?

2. As a child develops, do the attentional components tend to become more closely related?

3. As a child develops, does the average performance in the measures in each of the attentional components become better as a function of age?

THE REVIEW
OF THE RELATED LITERATURE

The review of the related literature in divided into four main parts: attention as a composite of three components, attention as an integrated process, development of attention, summary and possible results. The components of attention and how the [illegible] study utilizes past research is discussed under attention as a composite. The development of a theoretical model which sythesizes attentional components with an ongoing process is presented in the section on attention as integrated process. How attention develops is discussed under development of attention. The use of visual mediation as an appropriate method of investigating attention is also mentioned. The developmental relationships among attentional components are discussed in the summary. Finally, hypotheses for the study are given. Possible relationships are suggested between components, and their gradual integration with age. Included at this point are the delimitations of this study.

Attention Theory

Attentional theory in learning has presented the concept of attention in many guises. The viewpoints particular to this study are: attention as a construct of three components, and attention as an integrated cognitive process.

Attention As Composite

Posner and Boies (1971) name three attentional components: alertness, selectivity, and processing capacity. Keogh and Margolis (1975, 1976, 1976a) seem to have come up with a composite of attention in their studies with exceptional children. These attentional processes are: coming to attention, that is, focusing of attention on a task to glean a clear understanding of it and its requirements; decision making which reflects the impulsivity or reflectivity of the child to decide among alternate solutions when there is a degree of uncertainity; and finally, maintaining attention, which is concentrating on task over a period of time. (Keogh and Margolis, 1976, 1976a). Keogh and Margolis' view is consistent with others in the field (Douglas, 1972, 1974).

This composite will be adapted into this study with the following differences; whereas, Keogh's studies of attention used (1976, 1976a) fifth and sixth graders as subjects, and all were boys, the subjects in this study will be preschool and in first grade and will be comprised of both boys and girls; whereas, she studied educationally

handicapped, hyperactive boys along with normal boys, this study will concern itself with children within a normal range of intelligence and with no discernable educational problems; and whereas, she compared students in a non-developmental pattern, this study proposes to persue a developmental pattern.

Integrated Attention Models

The Gestalt and Behaviorist Period had predominated for several decades. Then, however, a re-birth in interest in attention was evident, due primarily to the publication of Broadbent's Model. (Kahneman, 1973; Kogan, 1973). This model, (figure 1), is relevant because it illustrates so clearly that attention is a multi-level process.

Insert Figure 1 here.

Hagen (1975) points out that one very rich aspect of Broadbent's Model is that information is processed selectively and at various cognitive levels. There is a continuous filtering of the relevant from the irrelevant information, thus refining it to arrive at the critical components of the information. The aspect of filtering in attention has since been investigated from a variety of points of view and with differing emphasis.

Neisser in 1971 also proposed a multi-level model that was comprized of a two stage process: first, preattention; second, focal attention. Where his model diverges critically from Broadbent's Model is in his emphasis upon

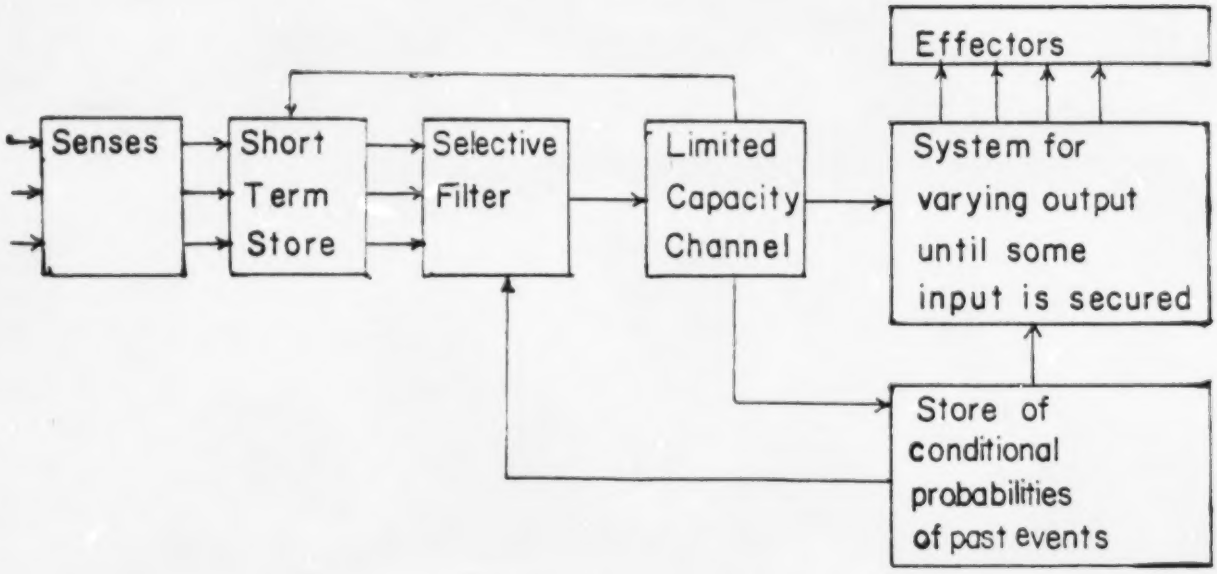

Figure 1. The Broadbent Model

the attender as the activator of the process. Broadbent casts the attender in a passive role. (Hallahan and Cruickshank, 1973).

Kahneman (1973) presents an integrated capacity model. In his model he proposes that not only are the subjects actively involved in their own attentional processes, but also that the feedback from the execution of ongoing activities and their demands causes an increase in the level of attention (figure 2). The next section suggests how both models might be utilized in describing the development of attention. Theoretically, all persons would go through all the steps of his model; the procedure becoming more facile with practice, and hypothetically, age.

Insert Figure 2. A Capacity Model for Attention. Kahneman (1973, p.10) here.

Attention as Development Toward Synthesis.

When attention is viewed from a developmental standpoint, features from both the composite and integrated models can be considered. This study basicaly uses the composite model, but a synthesized model could theoretically be formed. Through the use of task analysis, Keogh's composite is broadened but not changed when presented against a background of an integrated model such as Kahneman's Model. As the components of Keogh are singly discussed under the topics of field dependence-independence,

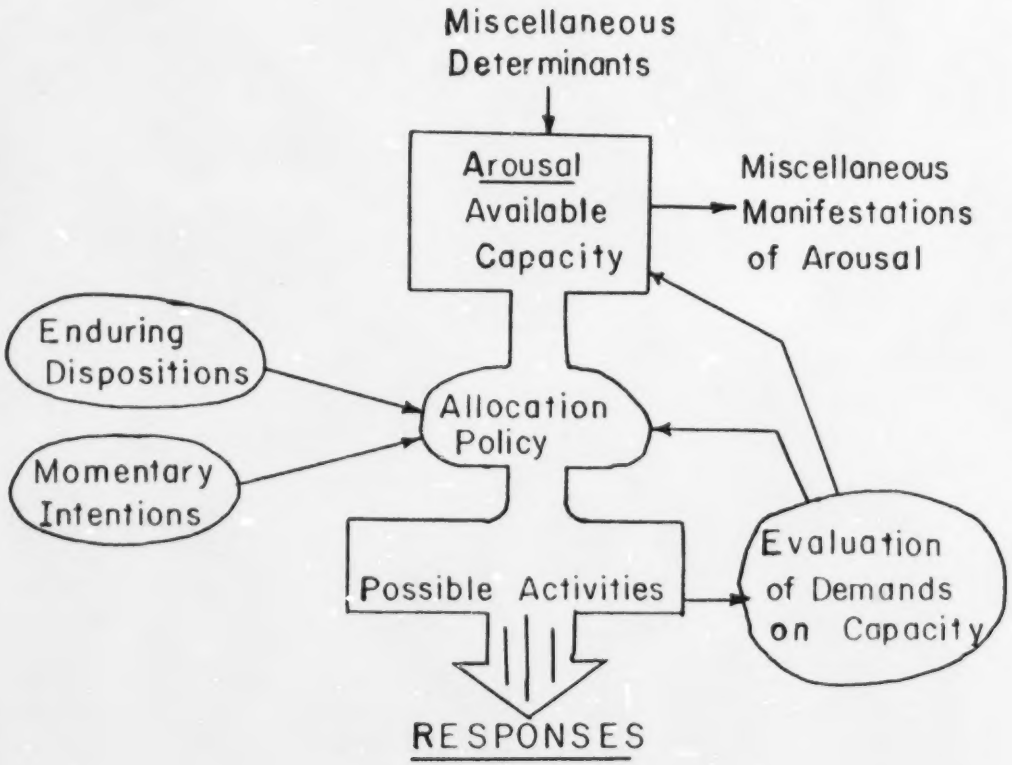

Figure 2

A Capacity Model for Attention. (Kahneman)

reflectivity-impulsivity and task attention, a comparison will be made with the steps of Kaheman's Model.

Field Dependence-Independence

A dimension of cognitive funcioning that demands selective attention is what Witkin (1977) calls field dependence-independence, also referred to as field articulation-diffuseness, analytic-global function. These areas converge with Piaget's and Werner's ego-centration and syncretic ideas in early childhood (Piaget; 1952). Task analysis reveals that the demands of field dependence-independence are reflected in the ability to break up an organized visual field in order to keep a part of it separate from that field (Witkin, 1971). In order to do this, the subject must indeed focus attention on the task and understand both it and its requirements (Keogh, 1976a; Werner,1948). The demands of field dependence-independence, therefore, are such that they correspond to Keogh's "coming to attention". As children under age five are still on the spectrum toward the diffuse-global as opposed to the articulated-analytic end, this impulsive-reflective component seems as if it would be very dependent on the development of the child (Blum, 1968) rather than on factors like training.

Field dependence-independence would correspond to the first three steps of Kahneman's Model: 1)Sensory Registration and Storage, 2)Unit Formation and 3)Figural

Emphasis. In step one, the senses register the organized perceptual field and stores it; in step two, the filter breaks the perceptual field up, (Broadbent, 1968), begins to select the information relevant to the task (Pelham, 1977), and identifies the units for encoding (Mansfield, 1970). Finally, in step three, a specific figural emphasis is required because the relevant object must be located.

Impulsivity-Reflectivity

The impulsive-reflective conceptual tempo is theoretically defined by Kagan (1965) as "the degree to which a person pauses to evaluate the results of his cognitive efforts in a situation where there is response uncertainty. A reflective person takes more time to produce his solution than does his impulsive counterpart and also tends to produce fewer errors (p.134)." All learning processes need impulse control (Douglas, 1974) because the child must often "continue to focus on stimuli long after he has lost interest... inhibit tendencies to respond to incorrect stimuli, some of which may have considerable attraction for him... delay responding until he has made a very careful search or considered alternative possibilities in order to be certain of his choice (p. 150)."

While cognitive tempo has been found consistent over time (Messer, 1976) and is considered a consistent trait related to a child's perceptual analysis, the accuracy of a task depends upon its specific task requirements and

compatibility to the child's perceptual analysis (Zelniker, Bentler and Renan, 1977).

Assignment of attention is begun in step three, Figural Emphasis, where a decision is made as to the amount of attention to be allocated. Within the Activation of Recognition Units, step four, there is possible interpretation of some objects. This is returned as Information to Allocation Policy where new objects need more effort and attention than familiar objects. Reflectivity enters into both steps five and six (Selection of Interpretation, Response Selection) for selections of interpretations and responses require selections among alternate choices (Kahneman, 1973). An example will demonstrate how this process works for the field dependence-independence and impulsive-reflective dimensions.

The instructions to the children are that they look for the stimulus triangle within the complex figure. Please note Figure 3, Typical Complex Figure.

Insert here Figure 3, TYPICAL COMPLEX FIGURE.

Step 1, sensory registration and storage, allows the children to recognize that there is a dog-like animal dressed in a shirt; in step two, unit formation, the children direct their eyes to the various parts of the drawing, seeking a previously shown triangle, therefore, at this step seeking angles and/or lines that might be appropriate to this task. In step three, figural emphases,

Figure 3 - Typical Complex Figure

the children now must disengage entirely the cute animal drawing and become perceptually aware ofthe stimulus triangle and its properties. In steps four and five, activation of recognition units and selection of interpretation, the children decide which part of the picture they recognize as the stimulus triangle. The pilot study (1968) has shown that on this particular picture, children choose either the front collar or the portion of the shirt in front of the arm.

Task-Attentiveness

There seems to be some substantiation for supporting the traditional and popular idea of "readiness." It would seem to be a perceptual or cognitive kind of readiness that leads to performance factors, namely those factors that delineate an individual's ability to attend to, to perform, to elaborate,and to sustain a task or a series of tasks over a period of time. This is the heart of the question of task-attentiveness, i.e., sustaining attention over time. (White, 1973; Broadbent, 1958). The conventional vigilance tasks have the subjects respond to infrequent signals or stimuli but must watch for them over a long period of time. Task attention is considered a continuing process and is examined as a function of time (Broadbent, 1968).

It would seem that not only vigilance but also engagement of the participant is needed to make sense of the motion of task attention (Keogh, 1972). One critical area

in Neisser's model is that of the concept of the active participant. The attender is the activator and allows for active construction in the cognitive process (Hallahan and Cruickshank,1973). As referred to above, Neisser (1967) has presented a theoretical model of the attentional processes which he called "a special allocation of cognition (p.39)." This model proposes a dual stage: first, a preattentive level which might encompass what has been discussed as selectivity and reflectivity; the second which is a more articulatory stage, encompasses the abilities to analyse and synthesize that which is attended.

Task attentiveness relates to Kahnemann's Model basically as a feedback loop or a do loop in a flow chart. Is the task complete when the first response is made? If not, how much energy (Neisser, 1967), effort (Kahnemann, 1973) and attention (Douglas,1974) should be allotted to achieve closure. To sustain a task or series of tasks involves the repetition of many of the initial decisions slightly altered because of the feedback of the environment (Kahnemann, 1973).

To continue the example of triangle selection: After the children choose the shirt front or the shirt collar, they now must reflect and decide whether it is indeed the response that corresponds with the requirements of the task, i.e. find the stimulus triangle.If it is, they will achieve closure. But if it is not, as in the case with the collar, then all the previous steps in the model must be repeated

until closure is reached. This latter exercise is "task attentiveness".

How Attention Develops. Attention is thought to be the selective element in processing information important to the regulation of behavior from the surrounding environment. This behavior corresponds to the management of the task and is set by the socializing adults (Hunt, 1972). Only to the extent that interaction between the child and his environment has progressively developed will more complex forms of attention appear.

At first the selection is involuntary, relying on novel or intense stimulation from the environment. Then the selectivity becomes more social in aspect and the relevant stimulus is set apart by verbal or gestural cues by socializing adults. Finally, the child himself can voluntarily respond, by choosing to direct his own attention. He can react with the environment (Gagne and Rohwer, 1969).

Heinz Werner (1948) sees development as the ability to separate out the relevant, the independent facets of reality and understand them, per se. Blum (1968) sees this as attention process which is more and more directed to the relevant and related parts and subsequently is put into a meaningful whole.

Blum (1968) also points out that this mirrors Piaget's thinking (1952) with regard to intellectual development which he suggests falls into three stages. These follow the sequence of syncretic definition. First children use global features to explain the concept; then they get a fleeting grasp, that is, they can understand the concept in some ways but not in others; finally, in the third stage, children master the concept and are able handle it in concrete, immediate situations.

Werner and Piaget are suggesting, it would seem, the same set. Werner sees the concept attained by selecting out the irrelavant information, whereas Piaget sees the concept attained by the reconciling of the global features, that is, taking in all the features until the whole is understood. Attention can thus turn in dichotomous directions: increasing, on the one hand, the number of properties as opposed to more articulating refinements of properties, on the other hand. In either case, the relevant properties must be extracted for the concept to be understood, (Blum, 1968) and it would appear that, with age, children improve in their use of stimuli and choose those dimensions that are the most relevant (Vurpillot, 1968). They then order them hierarchically into a set where critical features are established (Gilmore, 1968).

Development with regard to the components studied in this research seems to become more accurate as the child grows older. The child improves with age in his ability to attend selectively (Vurpillot, 1968). Even when he cannot use sensory orientation, as in audition, selective attention still improves with age (Maccoby, 1969). Children become more field independent with age (Witkin, 1977). Children become more reflective with age. (Messer, 1976; Wright, 1973; Ward, 1973). Achenbach, (1969) found that reflective children do better in an analogical reasoning task, thus implying a relationship with verbal comprehension. Also, the ability to stay on task seems also to improve as the child gets older (Hagen, 1972; Zelnker et al., 1972). Zelnker also found, however, that reflective subjects were able to sustain attention longer than impulsive subjects. These preceeding studies were done with subjects older than the present study. This study includes, however, not just the relationship of each component with age but also the relationships between the components with a developmental perspective.

Verbal Mediation

There are diverse explanations in the literature regarding the importance of verbal mediators in the structure of attention. As this study will approach the problem of attention in a predominately visual way, this section will discuss the reason why verbal mediation is not explored.

Yedovitskaya (1971) says the role that language development plays in attentional processes is critical. The ability to use linguistic symbols is said to be essential to the direction of attention. These language cues or external attention mediators given by the socializing adults precede the use of cues of the children in directing their attentional behavior (Yedovitskaya, 1971).

Luria (1961) felt that activities of younger preschoolers could be manipulated by verbal instruction. When children internalize the verbal cues previously associated with the socializing adult, they can then direct their own attention to what is relevant in any stimulus situation. Also, it was shown that selective attention can be increased by labeling so as to notice relevant cues (Hagen, 1972).

Vurpillot (1968) asserted that this selectivity can be better explained by perceptual training or a perceptual model rather that by the intervention of verbal mediators. Also, contrary to the suggestion that speech is of primary importance, Meachan (1975) did a study that demonstrated that preschoolers would more likely attend to pointing cues than to verbal cues. He suggested that it seemed necessary to consider attention as a factor of various modes of representation and that non-verbal means of interaction with preschoolers should not be neglected. Brown (1977) showed that children under five tended to use a visually coding

system to attend in the learning prccess. It would then seem appropriate to use a predominately visual mode in this study.

Summary

The review of the literature shows in summary the following things. Attention is not a single variable but a composite of several components (Keogh and Margolis, 1972, 1976, 1976a, Douglas 1972, 1974) These variables have been explained in detail above.

An approach to measuring the relationships within attentional processes in preschoolers which seems logical is one which measures the relationships of the components of attention: coming to attention (field dependence-independence), decision (impulsivity-reflectiveness), and task-attention (vigilance-engagement), (Keogh, 1975; Keogh and Margolis, 1976, 1976a; Douglas, 1972). This choice of attentional components is reflected often in the literature as the constructs of attention (Mackworth, 1976, Musser, 1970, Kagan and Kogan,1970). Measurement that is taken in a predominently visual way seems to be appropriate (Meachen, 1975; Brown, 1977). Several studies have shown that the attentional components relate to age. (Vurpillot, 1968; Maccoby, 1969; Pick, Frankel, and Hess, 1975; Smith and Kemler, 1977; Messer, 1976; Wright, 1973; Block, Block, and Harrington, 1974).

There appears to be no evidence in the literature of a study relating attentional processes to each other from a developmental perspective on a preschool level. However, the need for this kind of study has already been mentioned. (Kraut, 1977; Blum, 1968; Meacham, 1975).

This gives rise to the following hypotheses:

Hypothesis 1 is that reflectivity is related to field independence and task attention and that field independence is also related to task attention within age groups.

Hypothesis 2 is that reflectivity will significantly increase as field independence increases and will also increase as task attention increases across age groups.

Hypothesis 3 is that the average performance in the measures of the components of attention increase significantly as a function of age, i.e. across age levels.

It would seem that as children's learning patterns become more integrated, relationships among the components of attention should increase. The following patterns then are possible results. There should be progressively stronger positive relationships between the task attention errors, impulsivity errors, and field dependence errors, and that these errors should inversely relate to age. There should be a progressively integrated positive relationship between latency (response time on the KRISP) and response time on the embedded figures (PEFT) and age. Task attention

errors of omission and commision should decrease as latency and age increase. Errors of commission on the task attention test (PAVT) should relate to errors representing impulsivity on the KRISP. In summary, a definite pattern of integration of the components should appear as a function of age.

Delimitations

The study is limited to three through six-year-old children with normal or corrected auditory and visual acuity.

Variables related to physiological concommitants of attention, e.g. arousal, skin conduction, rate of heart beat, anxiety, eye-scanning procedures or drugs (Hebb,1976) are not included.

This study is limited to the cognitive styles defined in terms of field dependence-independence, reflectivity-impulsivity, and does not include cognitive styles defined in terms of relational, analogical or inferential reasoning (Kagan and Kogan,1970).

This study is limited to the responses of the children as tested and in no way measures the tendency for attentional inertia, or the tendency to utilize constrictive or flexible strategies in attentional processes (Anderson,1977).

THE DATA

AND THE TREATMENT OF THE DATA

The Data

The data of this study are the children's responses to the Preschool Embedded Figures Test, the Kansas Reflectivity-Impulsivity Scale for Preschoolers, the Preschool Attention-Vigilance Test, and the Peabody Picture Vocabulary Test and the normative data given for each instrument.

Subjects. The subjcts are one hundred seventy eight through six-year-old childran attending Academy Day Care, TLC Day Care, and the Virginia Christian Academy, Inc., Cloverdale Preschool, and Woodbridge Primary Day School, all private schools or day care centers.

The Boards of Directors of the five institutions were formally requested to allow the testing and treatment of the students in their institutions. Verbal agreements were obtained from the five institutions. Parents have given prior permission for testing. Each institution will be asked to give a description of their students, including

socioeconomic status, age and sex.

Test Descriptions.

Preschool Embedded Figures Test (PEFT) was designed by Coates (1972) to assess perceptual and cognitive style (field dependence-independence) in three through five-year-old children. This is accomplished by the children's ability to disemble figures from a surrounding visual background. The child being tested is shown a stimulus triangle and asked to identify the triangle in a complex figure (Please note Figure 3). The child is limited to thirty seconds. Its retest reliability ranges from .74 to .91. (Coates, 1972). The reliability for six-year-old students was determined to be .8034 (Pilot Study; June,1978). There are 24 items on this test. The score of the test may be defined in terms of number correct or in number of errors. Age is measured in months. Where a ceiling effect is suspected, the Children's Embedded Figures Test will be administered (Witkin, 1971).

The Kansas Reflectivity-Impulsivity Scale for Preschoolers (KRISP) was developed by Wright (1972) to assess impulsivity-reflectivity in two through six-year-old children. The children must choose between alternatives in a match the standard stimulus (Please note Figure 4). The test has an internal consisency reliability of .62-.71 for time and .82-.84 for Errors (White,1973). The child's total errors and mean time to first response on the ten test items

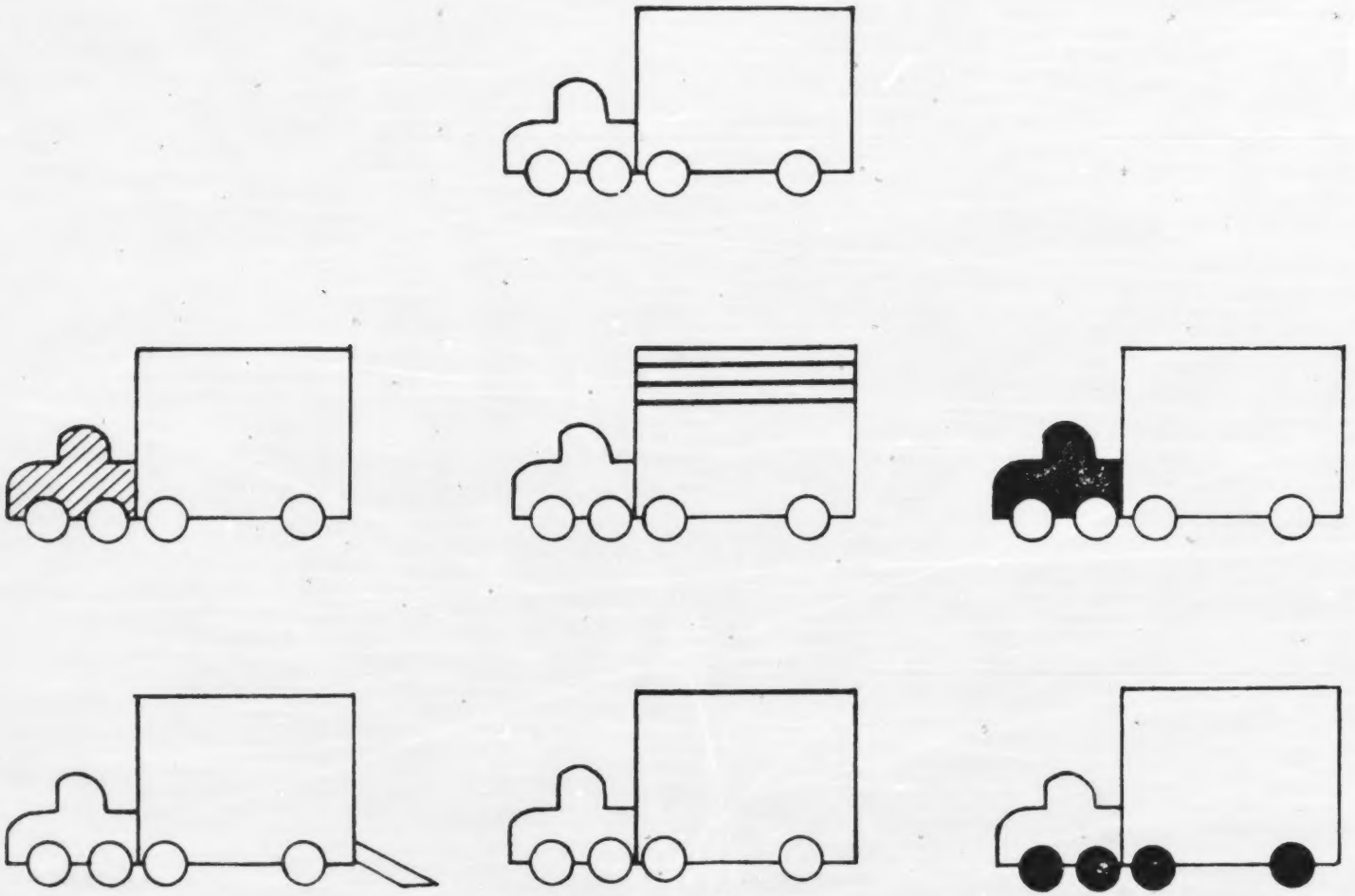

Figure A. Sample KRISP Item

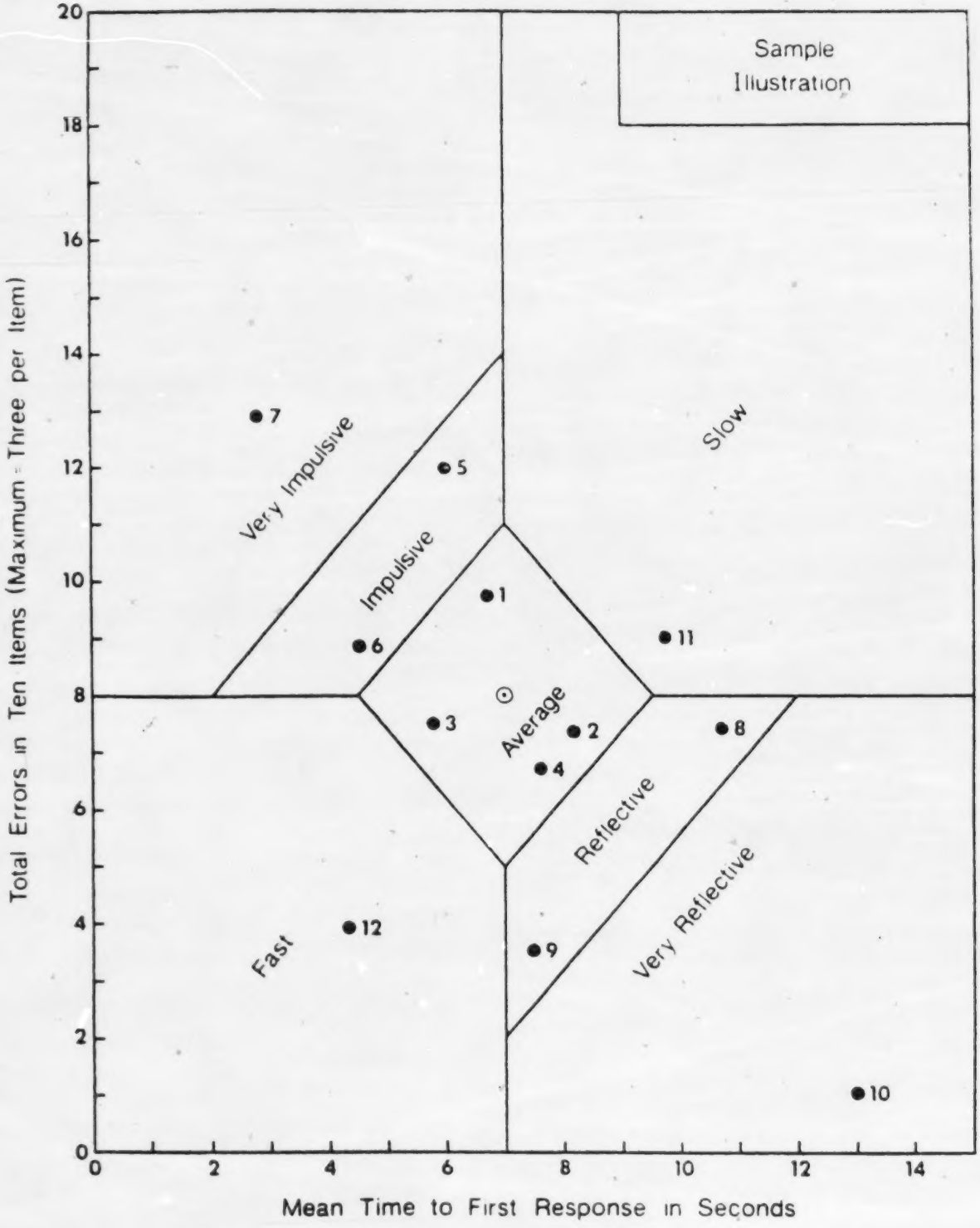
Sample
Illustration
Very Impulsive
Impulsive
Slow
Average
Reflective
Very Reflective
Fast
1
2
3
4
5
6
7
8
9
10
11
12
Total Errors in Ten Items (Maximum = Three per Item)
Mean Time to First Response in Seconds
0
2
4
6
8
10
12
14
16
18
20

Fig 5

are recorded as his scores. Please note Figure 5. Age is measured in months. Where a ceiling is suspected, the Matching Familiar Figures Test will be administered (Kagan, 1964).

Preschool Attention-Vigilance Task (PAVT) is a device adapted from the Children's Checking Task developed by Margolis in 1972. It was adapted by substituting pictures of animals for numbers. Several changes had to be effected, such as number of items on the page by the nature of the size of the items themselves. It is a technique for measuring ability to sustain attention on task. Its reliability for three through six-year-old children is .8740 for omission errors and .7470 for commission errors (Pilot Study; June, 1978). There are 245 items on this test. Figure 6 is a page sample of this test. Age is measured in months.

Insert Figure 6 here.

The Peabody Picture Vocabulary Test (PPVT) is a verbal measure of general vocabulary intelligence. The child is shown an array of four different pictures and is asked to chose that picture which defines the word spoken by the examiner. The retest reliability is .72-.77 (Dunn, 1965). Age is measured in months.

In all four tests, an examination of item difficulty showed that even the oldest children did not solve all of the items. The range of difficulty indeed did include the

TASK ATTENTION – VIGILANCE

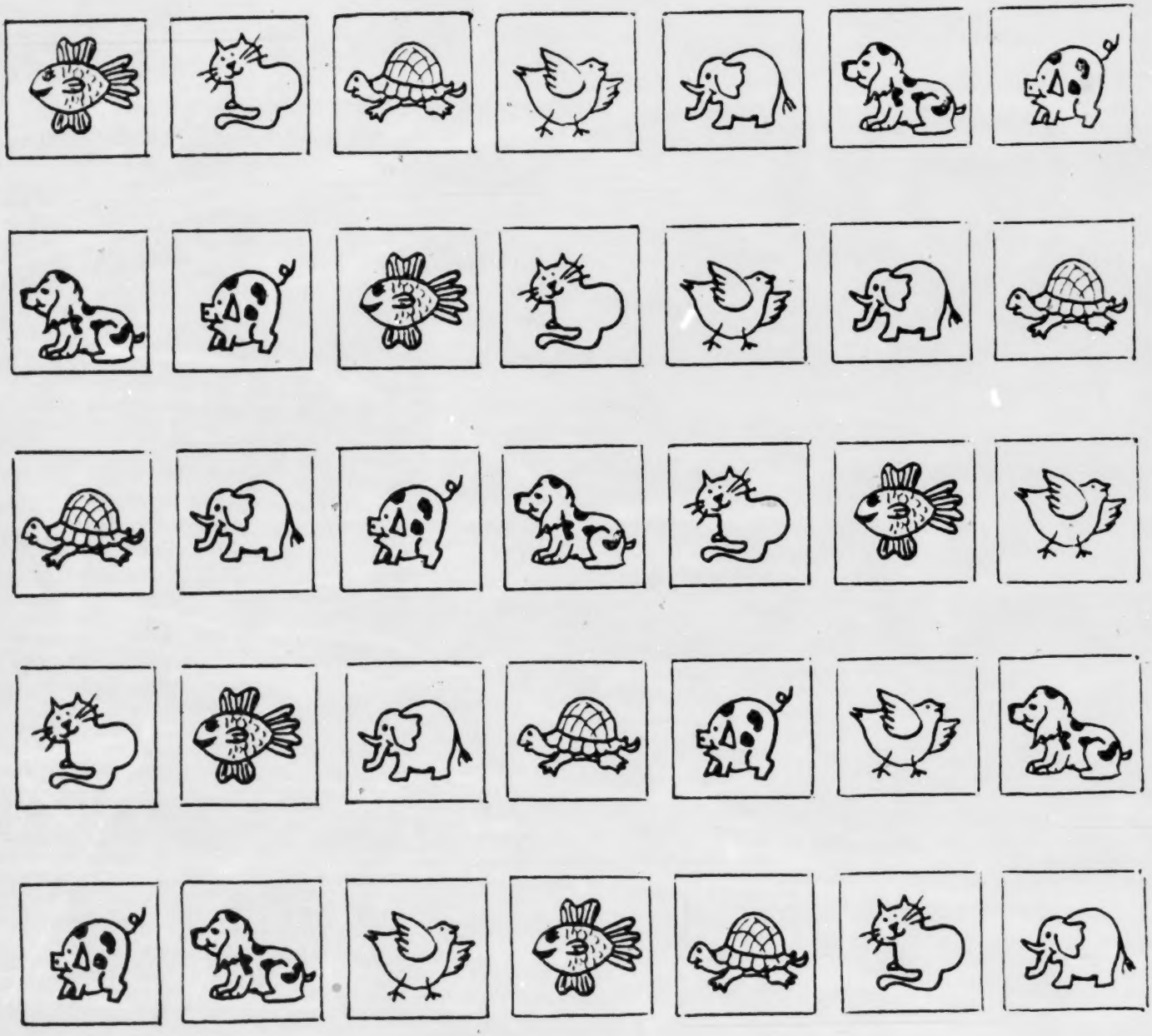

Figure 6.

six-year-old children. Any child not able to do the test items, as determined by preliminary items in each test, was be eliminated from the study.

All four tests were administered by an experienced diagnostician, who is not aware of the hypothasis. The Examiner spent one day in the classroom before the children are tested to minimize the effects of stranger anxiety in the testing of preschool children.

The PEFT and the KRISP and the PPVT were administered individually and in that order. The PAVT is a group test and will be administered the day after the examiner has entered the school designated for testing. The PEFT, the KRISP, and the PPVT each take about five minutes. The PAVT takes about thirty minutes.

The Definition of Terms.

Attentional Processes. Attentional processes are divided into three areas: coming to attention, impulsivity, and maintaining attention. By "coming to attention" is meant that problem of getting the child focused into a task so as to be able to ascertain that he has a clear understanding of the task. This is measured by the error score on the PEFT. By "impulsivity or reflectivity" is meant that problem of reflection over alternate solutions before decision. This is measured by the error score and mean time to the first response on the KRISP. By

"maintaining attention" is meant the ability to stay on task until closure, i.e. the satisfaction of completion as indicated by the time until 1) the actual completion of the task, 2) by the child's naming or explaining what he has done, or 3) by the child's statement of "I'm done", or 4) by the child's leaving the task for more than one minute. This is measure by two types of errors: errors of commission, which occur when the child marks items NOT called by the Examiner, and errors of ommission which occur when the child marks does not mark the item called by the examiner.

Results of the Preliminary Study

To validate the PAVT, a pilot study was conducted in June, 1979. Correlations between the variables were found using the Pearson Product-Moment Correlations Coefficients. For each correlation, a T value determined statistical significence (set at .05).

The hypotheses seem to be supported in that there were strong inverse correlations between age (measured in months) and the attentional components (measured in errors). Only the six-year-old children were given the PEFT and the KRISP, whereas all the children (from three through six years) were given the PAVT. Although the age range was restricted in the six-year-old group, thus giving artificially low correlations, there seems to be evidence that the PEFT, the KRISP, and the PAVT do correlate (Please note Table 1).

The data also show correlation between commission errors on the PAVT and errors on the KRISP (impulsive errors). It may be that the commission error data although usually not used with older children (Keogh, 1976) may be a good indicator of impulsivity with younger children. The average commission errors for the three-year-old children was 14.3; for fours, 6.3; for fives, 5.3, and for sixes, 1.3. Table 1 below gives a summary of data from the Pilot Study.

Insert Table 1 here.

Importance of the Study.

Lack of attention and impulsivity are among the most problematic in the learning situation (Keogh, 1975) and the only recently emerging state of research on attention and impulsivity (Trabasso, 1968) seems to give reasons for implications of extending knowledge of the behavioral state of attention, especially in the areas of early childhood education, and cognitive approaches to learning. In terms of the development of the attentional components , this knowledge of developmental trends, will give more sure direction in the planning of meaningful early childhood programs at each age level including preventive teach ageing, remedial teaching, teacher training and curricula planning.

TABLE 1

	Age	A-01	A-02	A-C1	A-C2	PS	PT1	PS2	PT2	KS2	KT2
Age	1.00	-.73**	-.60**	-.35**	-.35**	-.27	-.08	-.17	.05	-.37*	-.27
A-01		1.00	.87**	.27**	.26**	.02	.33	.10	.03	.31	.32
A-02			1.00	.23**	.20*	.34	.37*	.44*	.18	.54**	.21
A-C1				1.00	.75	.66**	.36*	.51**	.26	.35*	.31
A-C2					1.00	.55**	.29	.51**	.29	.67**	.45*
PS1						1.00	.59**	.80**	.68**	.54**	.34
PT1							1.00	.43*	.58**	.49**	.03
PS2								1.00	.61**	.44*	.46*
PT2									1.00	.21	.52**
KS2										1.00	.24
KT2											1.00

Pearson Produst-Moment Coefficients, Pilot Study, 1978

where A = PAVT, O= Omission Errors, C =Commission Errors, P = PEPT,

K= KRISP, S= SCORE IN ERRORS, T = MEAN TIME IN SECONDS,

* = significant at the .05 level, ** = significant at the .01 level

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It may well be stated that "attention is its many aspects is clearly part of the learning strategy, and may be a primary and critical component of learning success" (Keogh, 1975: p.31). Finally, Haring (1968), in stressing the importance of the process of attention, brought into focus points relevant to the educator (p. 6).

1.Attention is critical to responding.
2.A record of the child's responses is the only objective measure of attending.
3. Responding is essential to any form of instruction.
4. When children are observed not to be attending and responding to all forms of academic stimuli, conditions for learning require analysis and modification.
5. Changes in attention and rate of responding can be brought about by manipulation of the environment and the instructional variables within it.

"The cultivation of. . .attention is one of the most important problems of preschool pedagogy, and one of the important conditions in the child's preparation for training in school" (Yendovitskaya, 1971).

With this in mind, it would seem appropriate to partially replicate previous studies, but with preschool children and to extend them in other areas more peculiar to them, that is, developmental, perceptual, and cognitive approach.

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